REMARKS

The present application includes claims 1-25. Claims 1-25 were rejected by the Examiner. By this amendment, independent claims 1, 7, 13, 20, and 23 have been amended. All claims are now believed to be in allowable condition.

In the October 7, 2004 Official Action, Examiner cited the following rejections:

- Claims 1, 3-5, 7, 9-11, 13, 14, and 16-18 were rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al (US6642836).
- Claims 2, 6, 8, 12, 15, and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Brant et al. (US6278975).
- Claims 20-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Cox. (US6192339).

I. THE SECTION 102 REJECTIONS

The Applicant first turns to the Examiner's rejection of claims 1, 3-5, 7, 9-11, 13, 14, and 16-18 under 35 U.S.C. 102(e) as being anticipated by Wang. Amended independent claims 1, 7, 13, 20, and 23 and their respective dependent claims are believed to be distinguishable from Wang in present condition.

Wang discusses a system which allows a user to control all of the equipment in an operating room, even the lights, from a single voice-controlled user interface (Abstract; 4:60-5:6; 1:14-20). As explained in Wang, instruments generally have a unique control interface for their operation. (1:29-30). As such, a surgeon must independently operate each device and independently learn each control interface. (1:14-20; 1:29-62). For example, prior to Wang, in order for a surgeon to use two devices that were voice

operated, the surgeon must remove the microphone for one and replace it with the microphone of the other. (1:43-48). As another example, prior to Wang, if the doctor needed the lights dimmed, a nurse would have to physically walk and dim the lights. In the system of Wang, the doctor could control various apparatus within an operating room using a single user interface. (4:51-67).

In Wang, the doctor uses a single user interface, namely a voice control system, to select the piece of medical equipment he wishes to control, and then speaks commands to control the piece of medical equipment. The example provided at Col. 2, Line 54 – Col. 3 Line 6, explains that if a user wishes to select a laser, a user may speak a selection command such as "select laser." Subsequently, a user may then speak commands to control the operations of the laser. Figure 1 illustrates several other pieces of medical equipment which may be selected by a user and then subsequently controlled. Figure 1 includes "18 electrocautery," "20 robotic arm," "22 operating room table," "24 insufflator," "26 operating room lighting." Any of these pieces of medical equipment may be selected by a user by issuing a "select" command similar to "select laser" described above. Once the piece of equipment is selected, a user uses voice commands to operate the selected equipment. (9:13-18; 2:15-17; 2:33-45; 2:54-3:6).

For example, if a doctor wishes to select the robotic arm, the doctor may speak the words "select robotic arm" into a microphone. The system of Wang will then act as a switch between the available pieces of equipment, locating the robotic arm, and putting the user in communication with the robotic arm. The user may then speak various commands to control the robotic arm. If the user wishes to use a different piece of equipment, the user may speak "select operating room lighting." Again, the system of

Wang acts as a switch between the available pieces of equipment, locating the operating room lighting, and putting the user in communication with the operating room lighting. The user may then speak various commands to control the operating room lighting.

As the Examiner points out in the most recent communication, Wang hints at an alternative embodiment of using voice commands to select a piece of equipment, and then controlling the equipment manually. The discussion of this embodiment is very limited, and only appears in the following sections of the specification: col. 2, lines 45-48; col. 10, lines 12 –19. The manual control is simply controlling the equipment from the equipment's knobs, buttons, or other input devices normally used to control the piece of equipment. For example, a user may select the robotic arm by speaking the words "select robotic arm." Then, instead of speaking commands to control the robotic arm, the user would control the robotic arm using whatever knobs, joysticks, buttons or other console items are normally used to control the robotic arm. The functionality of the knobs, joysticks, buttons or other console items does not change and is not assigned to other input devices.

Wang does not teach the limitations of utilizing a "previously determined medical device" which is recited in independent claims 1, 7, 13, 20, and 23, as amended. In the present invention, a user may utilize a plurality of verbal commands to control a previously determined medical device. The medical device is previously determined because, unlike both Wang embodiments, a user cannot select which unit of medical equipment the user wishes to control. In other words, the system does not act as a "switch" between various pieces of medical equipment by speaking a "select" command. The user is limited to controlling the piece of medical equipment initially connected to

the system. As an example, the piece of medical equipment may be a medical imaging system such as with use of ultrasound, MRI, or CT images. (See paragraph 0023 of the specification). Continuing with the example, if the user previously determines to use an ultrasound system, the user is limited to controlling the ultrasound system throughout the application. Accordingly, Wang does not teach the limitation of utilizing a "previously determined medical device" which is recited in independent claims 1, 7, 13, 20, and 23, as amended. Therefore, Wang does not teach the limitations of independent claims 1, 7, 13, 20, or 23 or their dependent claims.

Additionally, Wang does not disclose the limitations of "assigning said function to an input device." These limitations are recited in independent claims 1, 7, 13, 20, and 23. In the first embodiment of Wang, a user speaks a voice command to select a piece of medical equipment to control. The user then speaks voice commands to control the piece of medical equipment. In the second embodiment of Wang, the user speaks a voice command to select a piece of medical equipment. Then the user utilizes the manual controls available on the control console of the selected piece of medical equipment to control the medical equipment. Neither embodiment assigns a function to an input device.

In the present invention, a first verbal command may be used to select a function. The function is selected verbally, allowing remote positioning of medical equipment, preventing contamination of a surgeon's hands or the medical equipment, and preventing unnecessary movement during surgery. (See paragraph 0005-0008 of the specification). The selection of a function by speech is in lieu of selecting a function using manual controls, such as by dials, switches, knobs, or joysticks. (Specification paragraph 0003).

A function, in the context of a piece of ultrasound equipment, may include printing or freezing an image, changing the focal zone of the image, adjusting the contrast or resolution of the image, or adjusting the orientation of the image, for example. (See specification paragraph 0022).

Once the function is selected, the function is assigned to a input device, such as a pedal on a foot-input console. (see specification paragraph 0022). One of the reasons the function is assigned to an input device is stated in paragraph 0012 of the specification. Paragraph 0012 describes a problem in the industry the present invention seeks to solve :

> One drawback that may occur in typical foot-controlled systems is reduced functionality. That is, the foot-controlled console may lack much of the functionality that the control console has. The reduced functionality of foot-controlled consoles may occur for a number of reasons. One reason a foot-controlled console may lack some of the functionality that the control console has is that there is limited space available on a foot-controlled console. Typical control consoles may include a large number of control devices for a wide variety of features of the medical imaging system. Therefore, in order to accommodate control of each feature of the medical imaging system, a large number of foot-input devices may need to be placed on the foot-controlled console. Because the surgeon's feet are typically larger and less agile than the surgeon's hands, the foot-input devices on the foot-controlled console typically may be larger and spaced further apart than the corresponding control devices on a typical control console. Thus, if the number of control devices on the medical imaging system console is high, the corresponding foot-controlled console may become too large and inefficient to use in practice. Therefore, in order to keep the foot-controlled console compact enough for efficient use, a limited number of foot-input devices, typically less than the number of control devices, may have to be placed on the foot-controlled console limiting the functionality of the foot-controlled console.

Paragraph 0012 of the specification.

Thus, in order to provide increased functionality to an input device, such as a foot-controlled console, a function is assigned to the input device. In such a manner, the same input device may be used to control a plurality of functions.

For example, the first verbal command spoken by the surgeon into the microphone is preferably a specific function performed by the medical imaging system such as "zoom." The user may then speak a second verbal command assigning a specific input device to control the function specified in the first verbal command. For example, a user may say "pedal one," indicating that pedal one on a foot input console will control a zoom function to view the image. Similarly, a user may speak a verbal command "orientation." The user may then speak a second verbal command assigning a specific input device to control the function "orientation." For example, a user may say "pedal one," indicating that pedal one on a foot input console will control an orientation function.

The system of Wang does not assign functions to an input device. The first embodiment of Wang utilizes verbal commands to control a selected piece of medical equipment. The present application disclosure explicitly contemplates and rejects controlling a piece of medical equipment using voice commands. As stated in paragraph 0014, speech recognition systems have the inability to make fine adjustments to continuous controls such as a joystick, trackball, or dial, for example. That is, verbal commands typically are not able to provide small continuous movements of controls, which may often be required of medical imaging systems. Therefore, the use of speech recognition systems may not be optimal for surgical applications because of their inability to perform fine adjustments. The present invention provides a solution to this problem by assigning functions to input devices, which in an embodiment, are capable of controlling fine adjustments.

Moreover, the second embodiment of Wang does not assign functions to an input device. In the second embodiment, a user manually controls the piece of equipment from the control console of the piece of equipment. In other words, the user verbally selects the piece of equipment, and then manually controls the piece of equipment using whatever knobs, dials, or buttons are available on the control console of the piece of equipment. The functionality of the control console is not assigned to an input device, such as various pedals on a foot-controlled console.

The system and method of Wang does not teach utilizing a "previously determined medical device" which is recited in independent claims 1, 7, 13, 20, and 23, as amended. Moreover, Wang does not teach "assigning said function to an input device." These limitations are recited in independent claims 1, 7, 13, 20, and 23. Accordingly, Wang does not teach the limitations of independent claims 1, 7, 13, 20, or 23 or their dependent claims. Therefore, the Applicant respectfully submits that the claims of the present application should be allowable.

II. THE SECTION 103(A) REJECTIONS

Wang in View of Brant

Next, the applicant turns to the Examiner's rejection of Claims 2, 6, 8, 12, 15, and 19 under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Brant. Amended independent claims 1, 7, 13, 20, and 23 and their respective dependent claims are believed to be distinguishable from Wang in view of Brant.

As described above, Wang discusses a system which allows a user to control all of the equipment in an operating room, even the lights, from a single voice-controlled user interface (Abstract; 4:60-5:6; 1:14-20). In Wang, the doctor uses a single user

interface, namely a voice control system, to select the piece of medical equipment he wishes to control, and then speaks commands to control the piece of medical equipment. Accordingly, the focus of Wang is a single user interface which may use voice commands to control multiple pieces of medical equipment in an operating room.

Brant discusses an improved speech recognition algorithm for use in voice command controlled assisted surgery. (Abstract). Similar to Wang, Brant discusses voice commands to control various pieces of medical equipment. Accordingly, the focus of Brant is an algorithm used to recognize voice commands in a surgical environment. (col. 1, line 65 – col. 2, line 9).

The system and method of Wang in view of Brant does not teach or suggest utilizing a previously determined medical device, which is recited in independent claims 1, 7, 13, 20, and 23, as amended. The medical device is previously determined because, unlike both Wang embodiments, a user cannot select which unit of medical equipment the user wishes to control.

Additionally, the system and method of Wang in view of Brant does not teach or suggest a system control and speech recognition processor for receiving a first verbal command from said microphone for selecting a function and receiving a second verbal command from said microphone for assigning said function to an input device. These elements are cited in amended independent claims 1, 7, and 13. Specifically, neither Wang nor Brant discuss assigning functionality to an input device.

Moreover, the system and method of Wang in view of Brant does not teach or suggest assigning said function to an input in response to said verbal commands; and controlling said function assigned to said input device when said input device is activated

by an operator. These elements are cited in amended independent claims 20 and 23. Specifically, neither Wang nor Brant discuss assigning functionality to an input device.

Specifically, Wang discusses consolidating multiple user interfaces into a single user interface for controlling an entire operating room. Brant discusses an improved algorithm for a voice command and control system which allows a surgeon to render voice commands using natural, conversational speech and which does not require the surgeon to participate in extensive training of the speech recognition engine. (Brant, col. 1 line 66- col. 2, line 9). Accordingly, Wang in view of Brant does not teach or suggest the limitations of independent claims 1, 7, 13, 20, or 23 or their dependent claims. Therefore, the Applicant respectfully submits that the claims of the present application should be allowable.

Wang in View of Cox

Next, the applicant turns to the Examiner's rejection of Claims 20-25 under 35 U.S.C. §103(a) as being unpatentable over Wang in view of Cox. Amended independent claims 1, 7, 13, 20, and 23 and their respective dependent claims are believed to be distinguishable from Wang in view of Cox.

As described above, Wang discusses a system which allows a user to control all of the equipment in an operating room, even the lights, from a single voice-controlled user interface (Abstract; 4:60-5:6; 1:14-20). In Wang, the doctor uses a single user interface, namely a voice control system, to select the piece of medical equipment he wishes to control, and then speaks commands to control the piece of medical equipment. Accordingly, the focus of Wang is a single user interface which may use voice commands to control multiple pieces of medical equipment in an operating room.

Cox discusses an improved method and apparatus to manage multiple speech applications. (Col. 1, Lines 55-56; Col. 2, Lines 31-32). Cox discusses applications capable of recognizing and translating voice commands or speech into actual machine commands and executing the machine commands as well as speech recognition engines.

The system and method of Wang in view of Cox does not teach or suggest utilizing a previously determined medical device, which is recited in independent claims 1, 7, 13, 20, and 23, as amended. The medical device is previously determined because, unlike both Wang embodiments, a user cannot select which unit of medical equipment the user wishes to control.

Additionally, the system and method of Wang in view of Cox does not teach or suggest a system control and speech recognition processor for receiving a first verbal command from said microphone for selecting a function and receiving a second verbal command from said microphone for assigning said function to an input device. These elements are cited in amended independent claims 1, 7, and 13. Specifically, neither Wang nor Cox discuss assigning functionality to an input device.

Moreover, the system and method of Wang in view of Cox does not teach or suggest assigning said function to an input in response to said verbal commands; and - controlling said function assigned to said input device when said input device is activated by an operator. These elements are cited in amended independent claims 20 and 23. Specifically, neither Wang nor Cox discuss assigning functionality to an input device.

Specifically, Wang discusses consolidating multiple user interfaces into a single user interface for controlling an entire operating room. Cox discusses an improved algorithm for managing multiple speech applications. (Abstract). Specifically, Cox

discusses a common environment to allow speech applications to execute simultaneously. A user may observe that he is operating on a single speech application as opposed to the actual operation of multiple speech applications. (Col. 1, Line 66 – Col. 2, Line 6). The focus of Cox is on acquiring and processing speech commands, not on providing increased functionality to an input device, such as a foot-controlled console, and assigning a function to the input device. Accordingly, Wang in view of Cox does not teach or suggest the limitations of independent claims 1, 7, 13, 20, or 23 or their dependent claims. Therefore, the Applicant respectfully submits that the claims of the present application should be allowable.

By this response, independent claims 1, 7, 13, 20, and 23 have been amended. Amended independent claims 1, 7, 13, 20, and 23 recite the additional language of "previously determined." Also, amended independent claims 1, 7, and 13 recite the clarifying language "a system control and speech recognition processor for receiving a first verbal command for selecting a function and receiving a second verbal command for assigning said function to an input device." As discussed above, Wang does not teach these limitations. Moreover, both Wang in view of Brant and Wang in view of Cox do not teach or suggest these limitations.

CONCLUSION

Accordingly, the application as amended is now believed to be in condition for allowance and an action to this effect is respectfully requested. If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below. The Commissioner is authorized to charge any necessary fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

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